

Date: Wednesday, 18/06/2008 8:58:58 AM
 User: Julie Lecocq

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	HIGH AFT X-TUBE 412
Job Number :	39907		
Estimate Number :	10559		
P.O. Number :		Part Number :	D412664203
This Issue :	18/06/2008	S.O. No. :	
Prsht Rev. :	NC	Drawing Number :	D412-664-243 REV D
First Issue :	1/1	Project Number :	N/A
Previous Run :	39855	Drawing Revision :	D
Written By :		Material :	
Checked & Approved By :	JLD 08.6.18	Due Date :	27/06/2008
Comment :	Est Rev:E 04.02.16 Reformat; Added D3189-1 K/DS Est Rev:F 06-03-29 Remove Coments on Pick List JLM Est Rev:G 06.12.08 per ECN 886 EC Est Rev:H 07-04-30 As per Rev D JLM Est Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC		
Qty:	1	Um:	Each

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

1.0	DC	DOCUMENT CONTROL
-----	----	------------------



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

JLD 08.6.18

508/27/23

2.0	PACKAGING 1	PACKAGING RESOURCE #1
-----	-------------	-----------------------



Comment: PACKAGING RESOURCE #1

3.0	D412664203TRN	Crosstube Turning Detail
-----	---------------	--------------------------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING-DETAIL

batch 640118

EL 8-7-3

4.0	BENDING	BENDING MACHINE - SKIDTUBES
-----	---------	-----------------------------



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

AWM 8-2-3

EL 8-7-3

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------



Comment: DIMENSIONAL CHECK OF X-TUBES

JLD 07-03

Date: Wednesday, 18/06/2008 8:58:58 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 39907

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

2T
08-07-09
EL 8-7-8

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

2T 08-07-08

8.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

5 08/07/09

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

5 08/07/09

10.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038 Or

Issue P/O: 6753 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

CL 08/07/11 2

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

PC 8/7/11 1

Date: Wednesday, 18/06/2008 8:58:58 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 39907

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



ml 08 07 14



(1)

Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

13.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml 08 07 14 (1)

14.0

QC14

INSPECT SPRAY PAINT



2007-15 (1)



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

15.0

D3595063570

RUBBER CUSHION



2.0



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Rubber Cushion

Batch: 35126

ml 08 07 15

16.0

D2856600

Abrasion Strip



Comment: Qty.: 1.7640 f(s)/Unit Total: 1.7640 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600(Cut to 10.090") Abrasion Strip 36398

ml 08 07 15

17.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1 Support 33471

ml 08 07 16

18.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D3189-1 Chafing Shield 37884

ml 08 07 16

Date: Wednesday, 18/06/2008 8:58:58 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 39907

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp 107502

ml 08 07 15

20.0

MS2192030

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: 106810

ml 08 07 16

21.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: 107621

Expiry Date: 08/2009

Time: 11:00am

3-Install clamps as per Dwg D212-664-203 using installaiton jig DT9024 with 0.010 thick brass shims on both chafing sheild (D3189-1). Torque clamps to 80-100 in lb.

ml 08 07 23

22.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

23.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

ml 08 09 16 ①

Date: Wednesday, 18/06/2008 8:58:58 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 39907

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

24.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch:

M107376 2x M107971 2x LC

25.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch:

M107013 LC

26.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch:

M107959 LC

27.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch:

M105077 LC 5/23 ①

28.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

808/7/03

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-203

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date

Time & date of packaging:

11:00am/02/07/03

Location:

PPP Rev:

LC 5/23 ①

B39907 D412-664-203

Date: Wednesday, 18/06/2008 8:58:59 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 39907

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

30.0

QC21

FINAL INSPECTION/W/O RELEASE



08/07/23

Comment: FINAL INSPECTION/W/O RELEASE

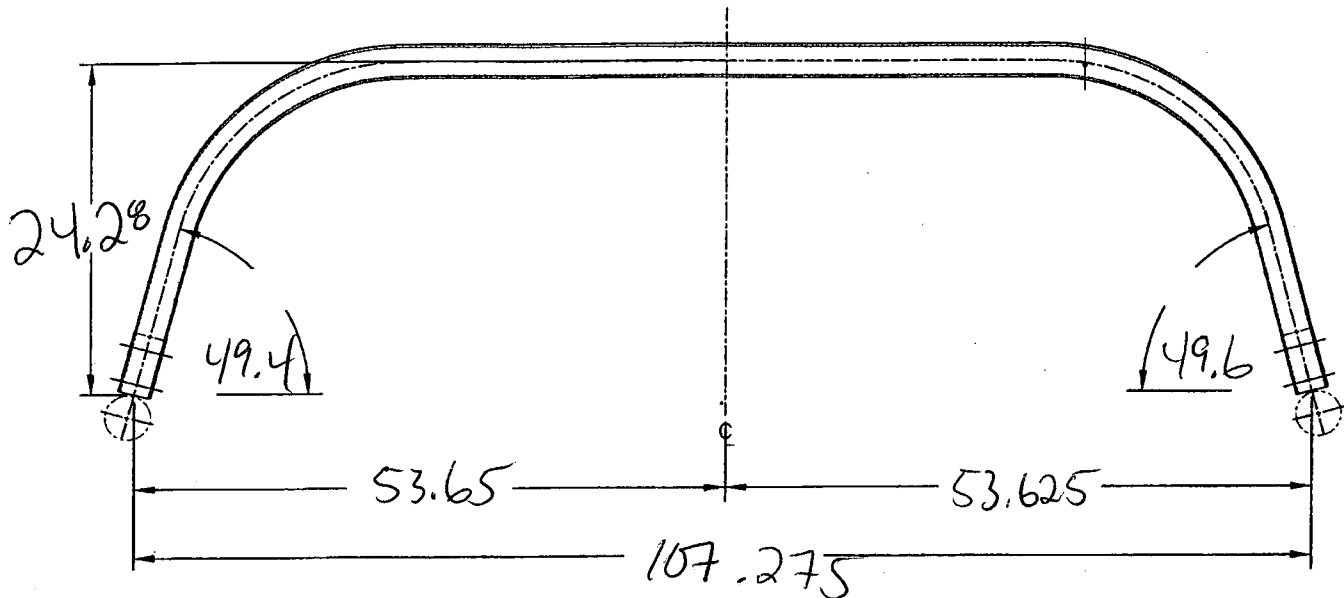
Job Completion



mf 08-07-23

DART AEROSPACE LTD		Work Order:	39907
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	<i>[Signature]</i> 080703
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	<i>[Signature]</i>
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM <i>[Signature]</i>	

DART

DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED CP	APPROVED [Signature]	DRAWING NO. D412-664-243	REV. D SHEET 1 OF 3
DATE 07.03.09		TITLE CROSSTUBE ASSEMBLY (412 HI AFT) SCALE NTS	
A	01.10.17	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30	
D	07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570	

RELEASE07.04.24 **[Signature]**

Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.09±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 39907

Copyright © 2001 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

**ACUREN****LIQUID PENETRANT TEST REPORT****P - 1386 1**

PAGE 1 OF 1

CLIENT	DART AEROSPACE	DATE	JULY 11, 2008	TIME	AM <input type="checkbox"/> PM <input type="checkbox"/>
ATTENTION	LINDA LACELLE	ACUREN JOB NO.	188 08 1386		
ADDRESS	1270 ABERDEEN ST	POWOW NO.	6753		
	HAWKESBURY, ONT.	WORK LOCATION	HAWKESBURY		
PROJECT	412 HIGH AFT X TUBES, 212/205 HIGH FED X TUBES, 206L AFT X TUBE.		ACCEPTANCE STD.	ASTM 1417/QSI-038	REV./DATE 2005
ITEM(S) EXAMINED	JOB #S 39907, 40175, 40176, 40116, 40117.				

JOB DESCRIPTION	PROCEDURE No. LT-0002 REV./DATE	TECHNIQUE No. LT-TECH2 REV./DATE
'PART NO. D412664203 /D212664101/D206667203. MATERIAL ALODINED ALUM. THICKNESS		
SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE		

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LGHT8171	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANTZL67	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O	MINIMUM DRY TIME	> 10 MIN.	OTHER	CAL JUNE 16 08	
DEVELOPER SKDS2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE	
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☒ IMPERIAL)

FLUORESCENT LIQUID PENETRANT INSPECTION
CARRIED OUT ON 100% EXTERNAL
SURFACE ON:

412 HIGH AFT X TUBE JOB#S 39907.
212/205 HIGH FED X TUBES JOB#S 40175, 40176.
206L AFT X TUBE JOB#S: 40116, 40117.

08 07 14

RESULTS: NO INDICATION OF DEFECTS.
ITEMS ACCEPTABLE TO STANDARD

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner operator and the owner operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

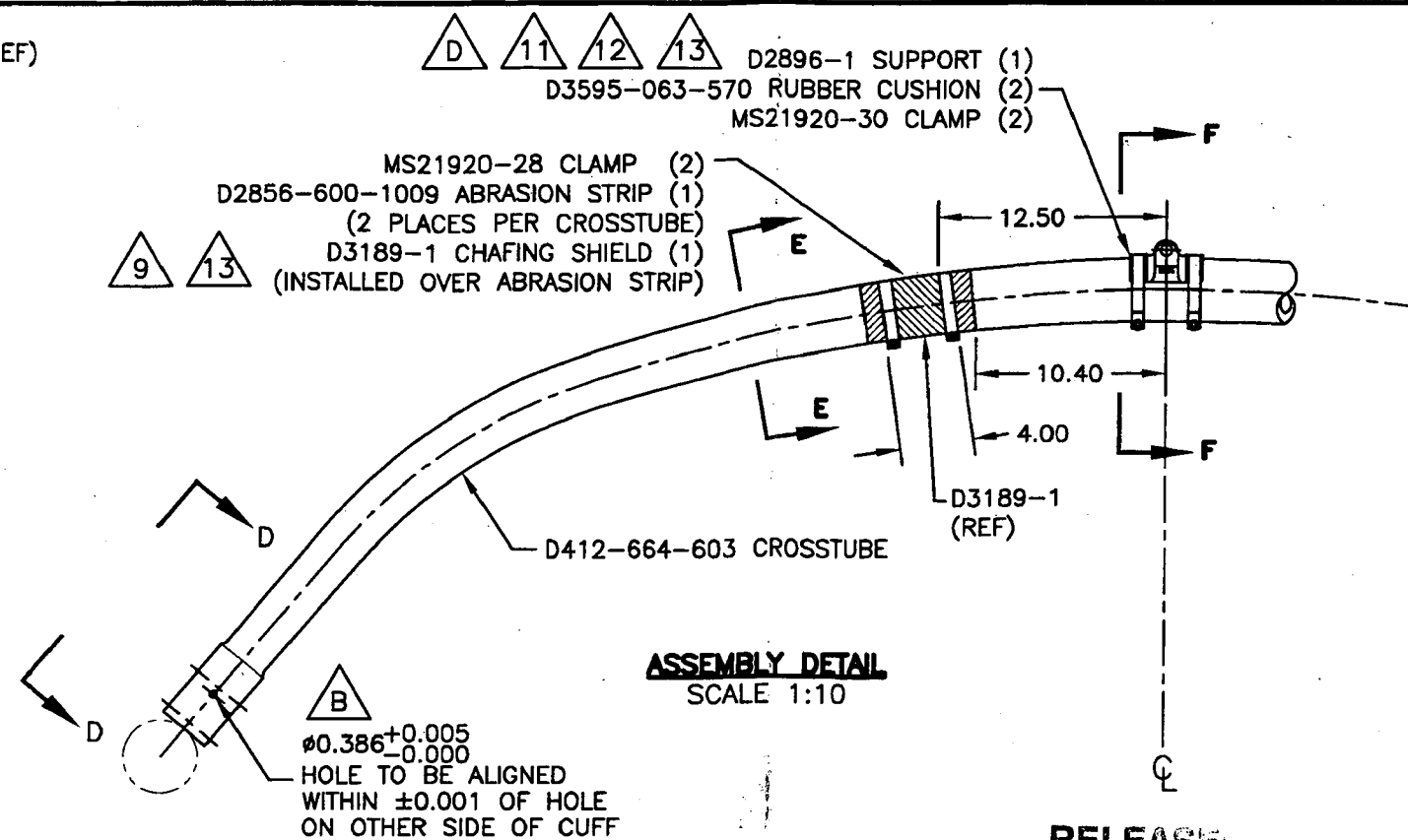
CLIENT REPRESENTATIVE	PRINT	SIGNATURE	DTR # E 19909
TECHNICIAN (SIGNATURE):	JASON HEWETT		REPORT REVIEWED BY:
NAME (PRINT):	1 st TECHNICIAN	2 nd TECHNICIAN	NAME INITIALS
CGSB LEVEL 2	SNT LEVEL	CGSB LEVEL	SNT LEVEL
CGSB REG. No 6156		CGSB REG. No	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

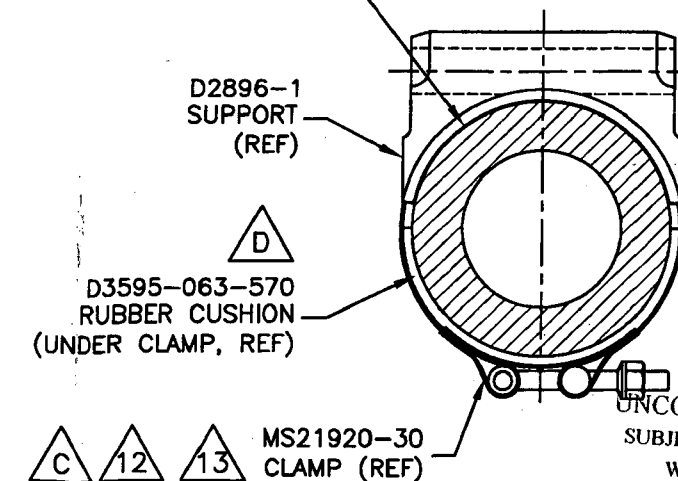
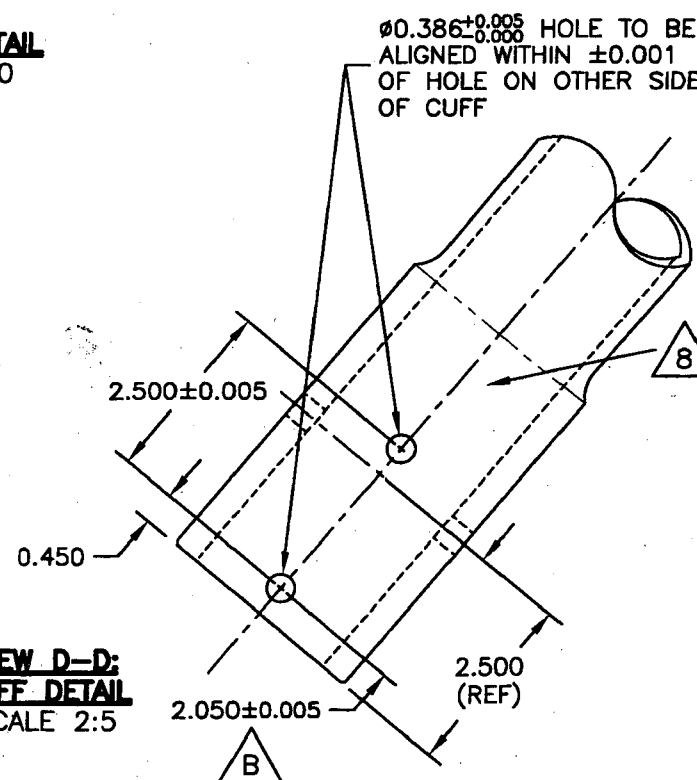
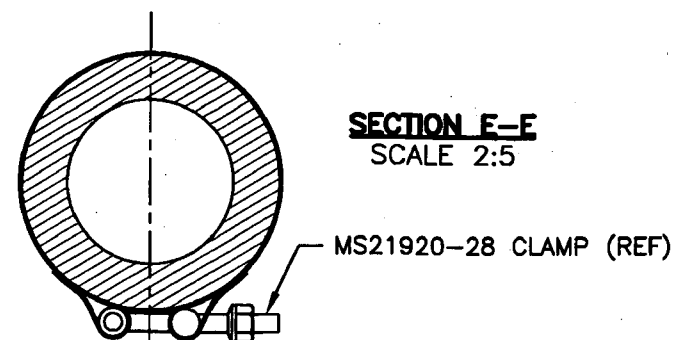
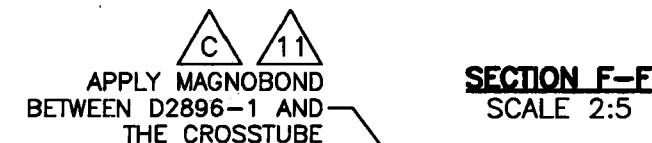
PINK - TECHNICIAN COPY

GOLD - OFFICE COPY



RELEASE

07.04.2



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED CO.
SUBJECT TO AMENDMEN
WITHOUT NOTICE
WORK ORDER
NO. 39907

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL
AND IS SUPPLIED ON THE EXPRESS CONDITION
THAT IT IS NOT TO BE USED FOR ANY PURPOSE
OR COPIED OR COMMUNICATED TO ANY OTHER
PERSON WITHOUT WRITTEN PERMISSION FROM
DART AEROSPACE LTD.

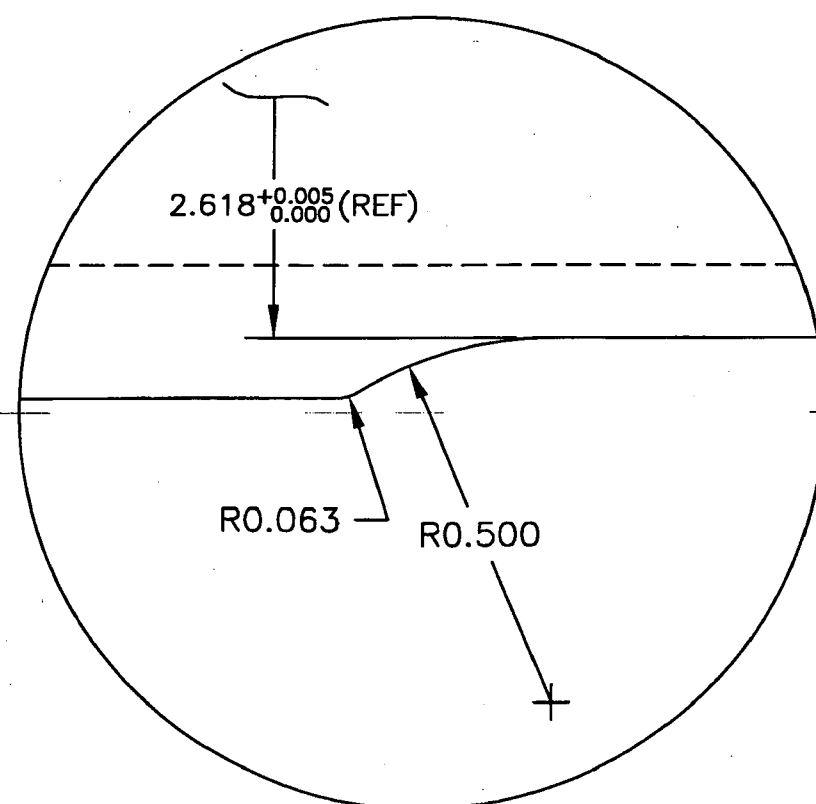
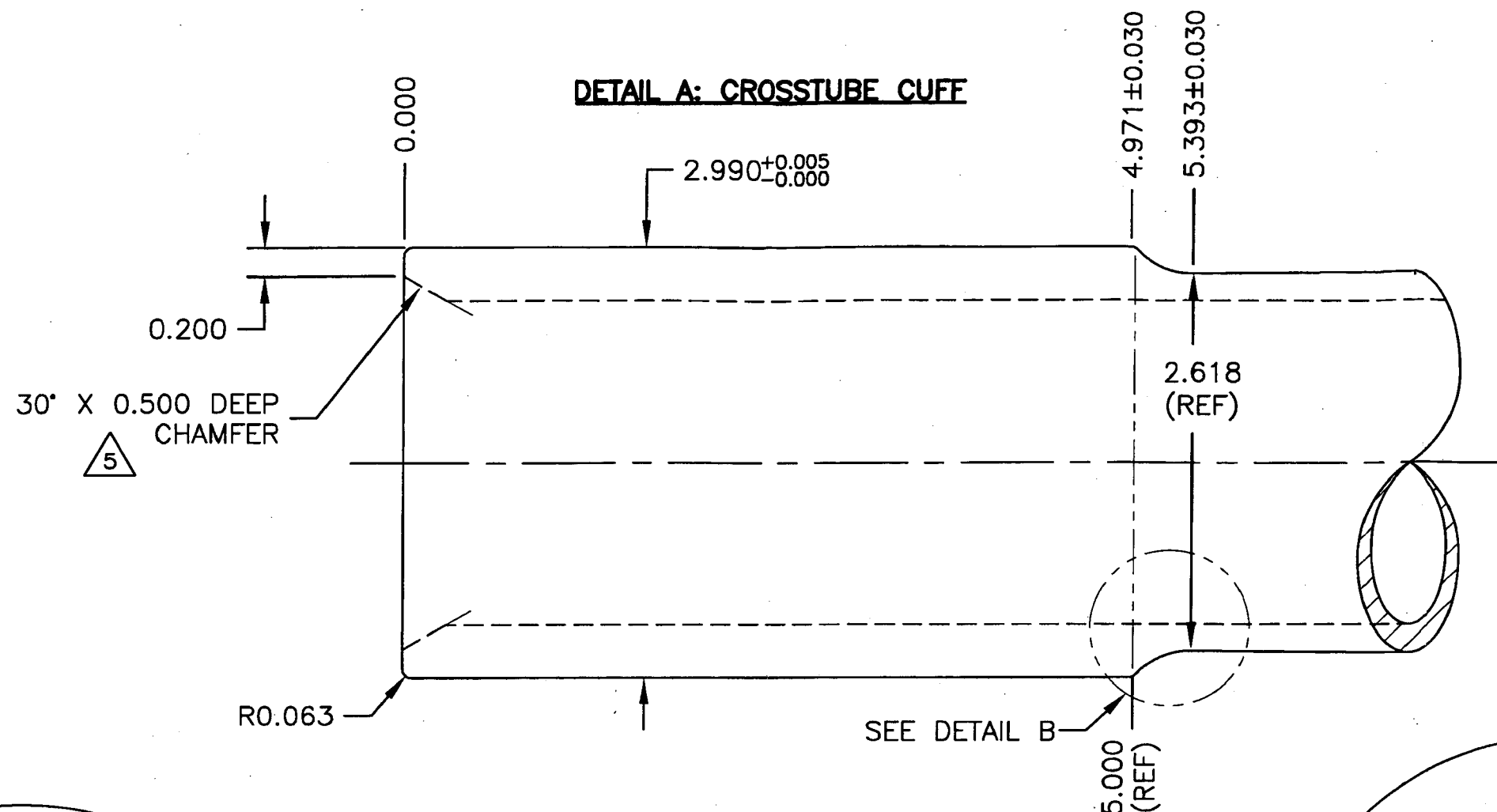
DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

REV. D
SHEET 2 OF 3

TITLE	SCALE
CROSSTUBE ASSEMBLY (412 HI AFT)	1:10

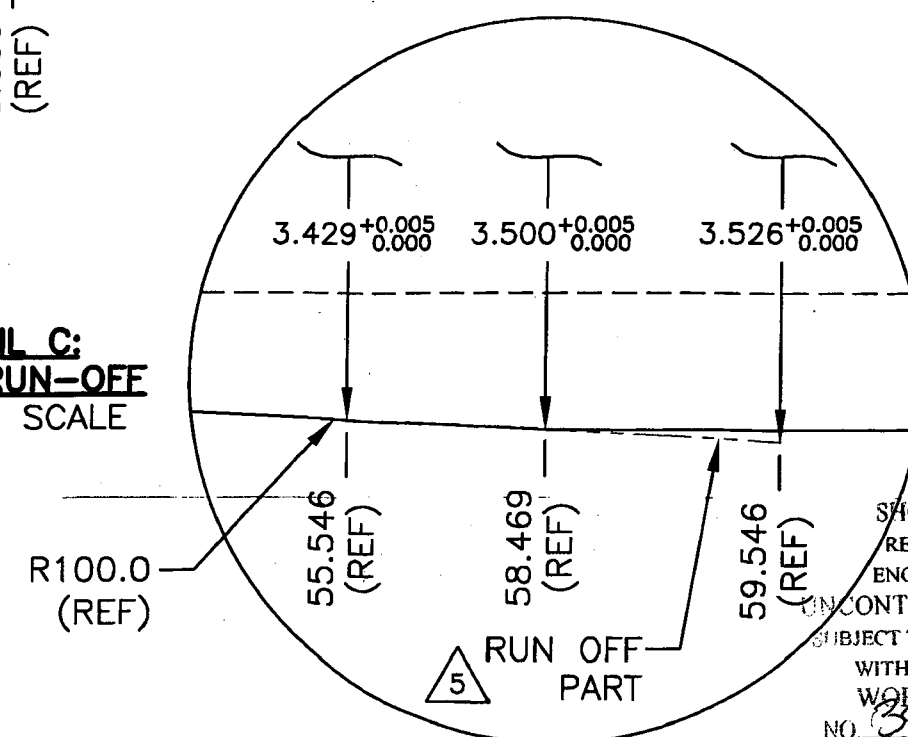
RELEASED
07-04-2448
PER ECN 887

DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
TRANSITION
SCALE 4:1**

**DETAIL C:
TAPER RUN-OFF
NOT TO SCALE**



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 39907

COPYRIGHT © 2001 BY DART AEROSPACE LTD.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL
AND IS SUPPLIED ON THE EXPRESS CONDITION
THAT IT IS NOT TO BE USED FOR ANY PURPOSE
OR COPIED OR COMMUNICATED TO ANY OTHER
PERSON WITHOUT WRITTEN PERMISSION FROM
DART AEROSPACE LTD.

DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED J	APPROVED [Signature]	DRAWING NO. D412-664-243	REV. D SHEET 3 OF 3
DATE 07.03.09	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE 1:1	